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ABSTRACT

Baseline data on change in reading achievement over summer vacation in the absence of summer school were obtained for two groups of middle-class children. The Cognitive Abilities Test (CAT) and the reading comprehension subtest of the Iowa Test of Basic Skills were administered in May to 172 third graders and 207 seventh graders. An alternate form of the reading subtest was given to the same subjects in September, and change scores were computed. Both groups gained over the summer months, but only the older-group gain was significant. There was no significant difference in mean gains between upper, middle, and lower ability students. The authors suggest that students' summer intellectual stimulation rather than their cognitive ability influences their summer achievement score change. (Author/AA)

SUMMER VACATION, ENVIRONMENT, AGE AND READING ACHIEVEMENT

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ABSTRACT

This study sought baseline data on change in reading achievement over summer vacation in the absence of summer school for two groups of middle-class children and related this change to student ability. The CAT and the reading comprehension subtest of the ITBS were administered to 172 third-graders and 207 seventh-graders in May. An alternate form of the reading subtest was given to the same subjects in September and change scores computed. Both groups gained over the summer month but only the older group gain was significant. There was no significant difference in mean gains between upper, middle and lower ability students. The authors suggest that a student's summer intellectual stimulation rather than his cognitive ability influences his summer achievement score change.

In an extensive review of studies of the effect of Title I money spent on summer schools, Austin et al (1972) concluded that "Summer Compensatory Education Programs in elementary mathematics, reading and language communication have generally shown modest achievement gains" (p. 179).

The major reason commonly given for providing summer school for disadvantaged children is that they not only do not make the one month's growth normally expected over the summer but in fact fall further behind over the vacation period. Little research on changes in achievement levels over a summer without summer school has been done with children from middle income homes, of different ages, and even less where age, social class and intelligence have been varied within studies. A study by Turner (1972) in England is an exception. He found very strong positive correlations between gain in "literacy" and social class and age, with a weaker correlation between gain in "literacy" and "intelligence." Other studies carried out generally are consistent with these findings. Soar and Soar (1969), studying fifth grade middle class children, found marked gains (.1 to .4 grade equivalent) in reading ability and other skills over the summer recess. Mously (1973) studied third graders from Los Arboles, California, and found slight gains in reading ability over the summer. Beggs and Hieronymus (1968) studied fifth grade children in Iowa randomly selected from different socioeconomic backgrounds and found no gain or loss in mean reading ability over the summer and varying gains and losses in other areas. In Frederick County, Maryland (1972), first and second grade dis-

advantaged children experienced substantial losses in reading and other language skills over the summer and lesser losses in mathematics skills. Hayes and Grether (1969) suggest that middle and lower class children progressed at similar rates during the school year, but that over summer recess progress almost ceased for the lower class children while it continued for the middle class children. None of these American studies indicates whether it is the lower mean "intelligence", the environment, or some other factor which is the primary reason for the relative losses in academic skills of the lower class groups over the summer. Only in Turner's English study is intelligence discussed as a variable.

The present study of middle income public school children was conducted to examine the gains or losses over the summer in reading achievement as measured by the Reading Comprehension subtest of the Iowa Test of Basic Skills. The tests were administered in the spring and fall of the third and fourth and seventh and eighth grades. The study sought information on three questions concerning reading comprehension: (1) What are the maturational effects of the summer vacation on such a group of children? (2) What gains or losses are experienced by children when grouped by intellectual ability? (3) What gains or losses are experienced when children are grouped according to age?

The study was done in a county in the state of Maryland, which had a median income in 1969 of $12,445. It was ranked third of the 24 Maryland counties and 36th of the counties of the nation in median family income. Only 4% of the families received less than $3,000 in 1969 and 84% received

more than $7,000.* The children to be studied were randomly selected in a two-step process, first the school, then the classroom within the school. It is reasonable, then, to assume that the children in this study came mostly from middle income homes.

The children selected were not given any treatment other than the summer vacation; none went to summer school.

Methodology

Two groups of students were studied, 172 third/fourth graders and 207 seventh/eighth graders. The first tests, administered in May, 1973, were: (1) the Non-verbal Battery of the Cognitive Abilities Test (Robert L. Thorndike and Elizabeth Hagen, Houghton Mifflin Company, Boston, 1971). Form L, Level A was used in the third grade; in seventh grade, Level E was used. There are eighty items in each test level. (2) The Reading Comprehension test of the Iowa Tests of Basic Skills (A. N. Hieronymus and E. F. Lindquist, Houghton Mifflin Company, Boston, 1971). Form 5, Level 9 was given to the third grade; in the seventh grade, Level 13 was used.

In September, 1973 the same pupils were again tested with the Reading Comprehension test of the Iowa Tests of Basic Skills. On this occasion Form 6, Level 10 was used in the fourth grade and Level 14 in the eighth grade. As different forms and levels of the test were used on each occasion, some differences between results may be attributed to these factors. However, as both forms of the tests are reported to be normed on a similar population it was anticipated that the use of different forms would make negligible difference. In addition, even though the levels of the tests vary in mean difficulty of items, they are so normed that similar grade equivalents should be achieved on any test

*U.S. Bureau of the Census, 1972 County-City Data Book, U.S. Department of Commerce, Washington, D.C., U.S. Government Printing Office, 1973. Table 2, Counties p. 225, Items 52-59.

level by children of similar ability -- the precision of the measurement is enhanced by choice of a level as close as possible to the children's ability levels (Hieronymus and Lindquist, 1971, p. 3), which was attempted in this study.

In May when the Reading Comprehension tests were administered, there was a problem regarding the time available for testing. In consequence, for both groups of students the tests were shortened so as to allow them to be administered in a forty-minute class period. For the third grade the test was shortened from sixty items to forty-two items; for the seventh grade, from sixty-eight items to fifty-seven items. The method used to validate the shortening was worked out with the test authors and judged by them to be appropriate.

Results

The raw scores on the Cognitive Abilities Test, nonverbal battery were converted to universal scale scores, grade percentile ranks and stanines for both groups. The inter-correlations among these scores ranged from .95 to .99.

The C.A T. raw scores were correlated with the pre- and post-Reading Comprehension raw scores for both groups. As expected, the younger children showed a higher correlation (.61 and .51 respectively) than the older children (.40 and .46 respectively). The older students' raw scores on the pre- and post-reading tests were more highly correlated (.83) than were the younger children's (.76).

Table 1 presents mean gains over the summer in Reading Comprehension skill for both groups.

Table 1 about here

The mean performance of both groups on the first test as indicated by grade equivalent is below the national mean by 3.7 months for the younger students and 2.8 months for the older students. The older group showed a mean gain of 6.5 months, which is the development expected over six and a half normal school months. This gain was statistically significant at the .01 level. (Analysis of variance was used as the test of significance in all cases). This mean gain score was substantially larger than expected. Possibly it is a statistical artifact, resulting from inadequate norm-conversions (resulting from the original norms and the local test revisions). In contrast, the younger groups showed a mean gain of 1.1 months, about what would be expected over the vacation and short school period between tests. Standard deviations for both groups ranged from a low of 1.08 to 1.75 years. The average gain score of the older children differed from that of the younger children, significant at the .001 level.

The next step in the analysis was to look at how these children performed when subdivided according to their intellectual abilities. The students were divided into 3 groups, the top and bottom 25 percent, and middle 50 percent. Because the mean gains for the two grade level groups are so different, they will be discussed separately. The results of the third/fourth graders' performance are presented in Table 2.

Table 2 about here

It is clear from Table 2 that in terms of cognitive abilities the third/fourth grade distribution of raw scores looks like a fair approximation of the

national normal curve. The most important fact in this table is that children in each ability sub group made on average almost the expected one-month growth over the summer. The children in the top quartile averaged almost two months' growth. The top and bottom subgroups have the largest standard deviations, 12 and 9.2 months respectively. There are no significant differences between the gains made by the three subgroups.

The result of the seventh/eighth graders' performance is presented in Table 3,

Table 3 about here

The raw scores presented in Table 3 indicate that this group's level of cognitive ability does not approximate the normal national distribution of scores. This group of students is unusually able. Their mean level of cognitive ability is almost a half standard deviation above the national norm. The students in the top subgroup are even more able. This subgroup of students made more than four times the expected growth which could be attributed to maturity alone. All the gain scores were statistically significant at .01 or more. There are no significant differences in mean gains between these three subgroups.*

The correlations between gain and intelligence were computed for each grade level. For the third/fourth grade, the correlation was .10 and not statistically significant at the .05 level; for the seventh/eighth grade the correlation was .16, statistically significant at the .01 level. In both cases the correlations are very low.

*Since the students for this analysis were divided into three subgroups (high, low and medium) on their Cognitive Abilities score, and not on the basis of their Reading Comprehension pre-test scores; one would ordinarily

Discussion

The data presented in Tables 2 and 3 suggest the following answers to the three questions posed in this study. (1) Children, randomly selected from a generally middle class county, on the average make one month or more growth during the summer vacation. (2) When divided into three different cognitive ability groups, children show slight, but insignificant, differences in mean gains over the summer - the more intelligent gaining more. (3) When considered according to age, older children average a greater gain over the summer than younger children.

The authors speculate that these findings have some implications for educating disadvantaged children during the summer. (1) The losses which these children experience without summer school are probably more explained by their lack of intellectual stimulation (environment) than by lack of cognitive ability. In this study students in the bottom quartile (as measured on the C.A.T.) of the third/fourth and seventh/eighth grades had mean percentile ranks respectively

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expect that there would be no statistical regression to the mean for the high and low intelligence groups from the pretest to the posttest. However, regression effects of a more indirect sort can occur in such a case (Campbell and Stanley (1967) p. 12) when the selection test and the pretest are administered close in time and scores are influenced in many cases by the same effects -- the weather, noise and/or the physical and mental state of the subjects. Such regression effects would be indicated if the scores on which the members of the extreme groups were chosen (the C.A.T.) correlated more highly with the Reading Comprehension pretest than with the posttest. If this occurred it would indicate the possibility of pseudogains for the low intelligence group and underestimated gains for the high intelligence group. However, this does not seem to have been the case in this study -- the correlations of the C.A.T. with the pre- and posttest scores in reading for both grade level groups are similar (see p. 4 above). Thus, the regression effect for the high and low ability groups has most probably been insignificant.

of 10 and 21, and averaged 0.8 and 4.9 months gain respectively over the summer. (2) The suggestion that it is the environment (i.e., middle class), not the cognitive ability of the child, is consistent with the Austin et al finding that disadvantaged children made modest gains as a result of summer school (positive environment) experiences. It is also in agreement with Turner's study in England, referred to earlier, and clearly adds support to the hypothesis that it is the home and community environment which has a significant effect on achievement gains over the summer months. Intelligence apparently has some effect but in this study it correlated significantly with amount of gain only for the older group of children. There was no statistically significant difference found within the two groups in mean gains when subdivided by ability.

The much greater mean increase in Reading Comprehension ability shown by the older children relative to the younger children is interesting to speculate about. Even though it may be in part a statistical artifact it may also reflect the fact that young children do not have the mental maturity to exploit the advantages in their environment over the summer. In addition, they may not have the desire to read the books, magazines and newspapers which the older children are quite able and willing to read over the long and often boring summer vacation. It also suggests that for the older children the demands of other school work during the school year may leave relatively little time for reading. The summer vacation thus provides much more free time, and if there is reading material available in the home and the children are old enough to read with ease and pleasure, they can spend much more time reading over the vacation than they do during the

school year. This finding may have favorable implications for teachers who are attempting to teach their pupils how to learn beyond the confines of school -- to have the desire and ability to continue learning throughout their lives.

Finally, for many children, the summer period without school may be essential for consolidation and development of reading comprehension skills initiated in school, particularly for older children.

This research suggests that advanced grade level and an advantaged home are probably significant variables, but certainly inadequate alone to determine for which children this school-free period is important. Further studies, specifically addressed to this question, would be most useful and the authors are currently pursuing this work.

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Table 1

Mean Grade Equivalents and Gain Scores

Iowa Test of Basic Skills
Reading Comprehension (grade equivalents)

GRADE		SPRING	FALL	GAIN (in months)	
3-4	Mean grade equiv.	3.63	3.64	1.1	(NS)
	Standard deviation	1.08	1.43	9.7	
7-8	Mean grade equiv.	7.62	8.27	6.5	(Significant
	Standard deviation	1.54	1.75	10.3	at .01)

(The difference between the gains of the two age groups was found to be significant at the .001 level)

Table 2

Mean Grade Equivalents and Gain Scores
for Three Ability Groups
(Third/Fourth Grade)

	COGNITIVE ABILITIES TEST (Non-Verbal Battery)			IOWA TEST OF BASIC SKILLS (Reading Comprehension - grade equiv.)			
	MEAN RAW SCORE	MEAN USS	MEAN GRADE PERCENTILE RANK		SPRING	FALL	GAIN (in months)
HIGH	73.2	136	86	Mean	4.42	4.59	1.7 (NS)
range	69-79			St.D.	.67	1.55	12.1
MEDIUM	59.4	107	47	Mean	3.52	3.60	0.8 (NS)
range	48-68			St. D.	.97	1.26	8.4
LOW	36.9	81	10	Mean	2.69	2.77	0.8 (NS)
range	2-47			St. D.	.90	.97	9.2

USS = Universal Scale Score

(Differences among the mean gains of the ability groups were found to be non-significant at the α = .05 level.)

Table 3

Mean Grade Equivalents and Gain Scores
for Three Ability Groups
(Seventh/Eighth Grade)

	COGNITIVE ABILITIES TEST (Non-Verbal Battery)			IOWA TEST OF BASIC SKILLS (Reading Comprehension-grade equiv.)			
	MEAN RAW SCORE	MEAN USS	MEAN GRADE PERCENTILE RANK		SPRING	FALL	GAIN(in months)
HIGH	74.2	167	93	Mean	8.37	9.19	8.2(significant at
range	71-79			St. D.	1.36	1.72	8.8 the .01 level)
MEDIUM	65.8	143	65	Mean	7.66	8.29	6.3(significant at
range	60-70			St. D.	1.47	1.57	10.3 the .01 level)
LOW	48.3	116	21	Mean	6.75	7.24	4.9(significant at
range	25-59			St. D.	1.43	1.53	11.6 the .01 level)

USS = Universal Scale Score

(Differences among the mean gains of the ability groups were found to be non-significant at the α = .05 level.)